

XenServer Installation Guide

5.5.0

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XenServer Installation Guide: Release 5.5.0

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This product contains an embodiment of the following patent pending intellectual property of Citrix Systems, Inc.:

1. United States Non-Provisional Utility Patent Application Serial Number 11/487,945, filed on July 17, 2006, and entitled "Using Writeable Page Tables for Memory Address Translation in a Hypervisor Environment".
2. United States Non-Provisional Utility Patent Application Serial Number 11/879,338, filed on July 17, 2007, and entitled "Tracking Current Time on Multiprocessor Hosts and Virtual Machines".

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Chapter 1. Introducing XenServer

Thank you for choosing XenServer™ from Citrix Systems, Inc.

About this document

This document is an installation guide for XenServer™, the platform virtualization solution from Citrix®. The XenServer package contains all you need for creating a network of virtual x86 computers running on Xen®, the open-source paravirtualizing hypervisor with near-native performance.

This document contains procedures to guide you through the installation, configuration, and initial operation of XenServer. This document also contains information about troubleshooting problems that might occur during installation, and where to get further information.

How this Guide relates to other documentation

This document is primarily aimed at system administrators who need to set up XenServer hosts on physical servers. Other documentation shipped with this release includes:

- *XenServer Virtual Machine Installation Guide* describes how to install Linux and Windows VMs on top of a XenServer deployment. As well as installing new VMs from install media (or using the VM *templates* provided with the XenServer release), this guide also explains how to create VMs from existing physical machines, using a process called *P2V*.
- *XenServer Administrator's Guide* describes the tasks involved in configuring a XenServer deployment -- how to set up storage, networking and resource pools, and how to administer XenServer hosts using the **xe** command line interface (CLI).
- *XenServer Software Development Kit Guide* presents an overview of the XenServer SDK -- a selection of code samples that demonstrate how to write applications that interface with XenServer hosts.
- *XenAPI Specification* provides a programmer's reference guide to the XenServer API.
- *Release notes* provide a list of known issues that affect this release.

New features in XenServer 5.5.0

XenServer 5.5.0 includes a number of new features and ongoing improvements, the most important of which are identified below:

- *Improved backup and snapshot support* allows you to perform live snapshot and clone operations on all storage types. This enables better support for backup utilities and practises, and helps to reduce disk space requirements for storing clones of virtual disks. You can now take snapshots from XenCenter as well as through the xe CLI. For more information on this feature, please refer to the *Storage* chapter and the *VM Snapshots* section of the *Backup and recovery* chapter in the *XenServer Administrator's Guide*.
- *Active Directory integration* to allow credentials to be verified against an AD server. This allows granting and revocation of access to XenServer pools easily and securely using existing IT infrastructure. For more information on this feature, please refer to the *XenServer hosts and resource pools* chapter in the *XenServer Administrator's Guide*.
- *Workload Balancing* to optimize VM placement and assist with balancing of workloads within a pool. This is done using the Workload Balancing server, available as a download with XenServer. For customers interested in creating custom queries on Workload Balancing data, Citrix provides customer accessible SQL views. For more information, see [CTX121348](#). For more information on this feature, please refer to the *Workload Balancing* chapter in the *XenServer Administrator's Guide*.

- *Integration with StorageLink services via the xe CLI* enabling advanced storage management capabilities via the Citrix StorageLink service, available as a download with XenServer. For more information on this feature, please refer to the *Citrix StorageLink Gateway (CSLG) SRs* section of the *Storage* chapter in the *XenServer Administrator's Guide*.
- *Improved operating system support* including new support for Red Hat Enterprise Linux 5.3, Novell SLES 11, and Debian Lenny.
- *XenCenter improvements* including Folder View, allowing you to view your resources as a simple list or organize them into folders, and improved search capabilities. Quick text queries provide a simple way to find resources, while the improved Search tab can be used to create more advanced queries as well as grouping and filtering the results. For more information, please refer to XenCenter help.

Chapter 2. System Requirements

XenServer requires at least two separate physical x86 computers: one to be the XenServer host, and the other to run the XenCenter application. The XenServer host machine is dedicated entirely to the task of hosting VMs and is not used for other applications. The computer that runs XenCenter can be any general-purpose Windows computer that satisfies the hardware requirements, and can be used to run other applications simultaneously.

XenServer host system requirements

The XenServer host is a 64-bit x86 server-class machine devoted to hosting multiple VMs. This machine runs a stripped-down Linux operating system with a Xen-enabled kernel which controls the interaction between the virtualized devices seen by VMs and the physical hardware.

XenServer can make use of:

- up to 128 GB of RAM
- up to 6 NICs
- up to 32 CPU cores

The following are the system requirements for the XenServer host:

CPUs	<p>One or more 64-bit x86 CPU(s), 1.5 GHz minimum, 2 GHz or faster multicore CPU recommended</p> <p>To support VMs running Windows, an Intel VT or AMD-V 64-bit x86-based system with one or more CPUs is required.</p> <div data-bbox="410 1234 1419 1486"><p>Note</p><p>To run Windows VMs, hardware support for virtualization must be enabled on the XenServer host. This is an option in the BIOS. It is possible your BIOS might have virtualization support disabled. Consult your BIOS documentation for more details.</p></div> <p>To support VMs running supported paravirtualized Linux, a standard 64-bit x86-based system with one or more CPUs is required.</p>
RAM	1 GB minimum, 2 GB or more recommended
Disk space	<p>Locally attached storage (PATA, SATA, SCSI) with 16 GB of disk space minimum, 60 GB of disk space recommended</p> <p>General disk space requirements for VMs:</p>

	<ul style="list-style-type: none"> • Product installation creates two 4GB partitions for the XenServer host control domain; remaining space is available for VMs • VMs based on the Debian templates are allocated a 4GB root device, and a 512MB swap device • Linux VMs are allocated a root device of 8 GB • Windows Vista and Server 2008 VMs are allocated a root device of 24 GB; other Windows VMs default to 8 GB.
Network	100 Mbit/s or faster <i>network interface card</i> (NIC). A gigabit NIC is recommended for faster P2V and export/import data transfers and for live relocation of VMs.

XenCenter requirements

The remote XenCenter application for managing the XenServer host can be installed and run on any Windows Server 2003, Windows Server 2008, Windows XP or Windows Vista machine.

The system requirements for XenCenter are:

Operating system	Windows XP, Windows Server 2003, Windows Server 2008, or Windows Vista SP1 and SP2
.NET framework	version 2.0 or above
CPU Speed	750 MHz minimum, 1 GHz or faster recommended
RAM	1 GB minimum, 2 GB or more recommended
Disk space	100 MB minimum
Network interface card	100Mb or faster NIC

VM support

Windows VMs can be created only on XenServer hosts equipped with Intel VT-enabled or AMD-V CPUs. All Windows VMs are created by installing the operating system from either the Microsoft installation media in the XenServer host physical CD/DVD-ROM drive or a network-accessible ISO image of the appropriate template.

Linux VMs do not require XenServer hosts that are equipped with Intel VT-enabled or AMD-V CPUs.

For a list of supported Windows and Linux distributions, see the *XenServer Virtual Machine Installation Guide*.

Chapter 3. Installing XenServer

This chapter describes how to install XenServer host software on physical servers, install XenCenter on Windows workstations, and connect them to form the infrastructure for a network of Virtual Machines.

The first sections describe the installation of a XenServer host and XenCenter, which are common to all deployments. The following sections describe several common installation and deployment scenarios and provide information that is specific to each scenario.

Installers for both the XenServer host and XenCenter are located on the installation media. The installation media also includes:

- a set of XenServer product documents in Adobe Acrobat PDF format
- a P2V tool for creating VM templates from an existing instances of supported Linux distributions running on physical servers. See the *XenServer Virtual Machine Installation Guide* for details.
- a tool for restoring a backed-up XenServer host control domain filesystem. See the section called “Backing up XenServer hosts” for details.

Installing the XenServer host

The XenServer host consists of a Xen-enabled Linux operating system, a management agent, VM templates, and a local storage repository reserved for VMs. The XenServer host must be installed on a *dedicated* 64-bit x86 server.

You can install the XenServer host from the installation CDs or set up a network-accessible *TFTP* server to boot using *PXE*. For details about setting up a TFTP server for PXE-booting the installer, see [Appendix B, PXE installation of XenServer host](#).

Note

Do not install any other operating system in a dual-boot configuration with the XenServer host; this is an unsupported configuration.

The main installation CD contains the basic packages needed to set up the XenServer host on a physical host, and to create Windows VMs using the Windows installation CDs. The XenServer package also contains a separate CD containing support for creating Linux VMs and six CDs containing source code for the included open-source software.

The installer presents an upgrade choice if it is run on a server that already has a previous version of XenServer on it. The upgrade process follows the first-time installation process but several setup steps are bypassed, and the existing settings for networking configuration, system time setting and so on are retained.

If you only want to create Windows VMs, you can install XenServer using just the first CD. If you want to install Linux VMs, be sure to

1. Download the Linux Pack ISO
2. Burn it to a physical CD if installing from a DVD/CD drive, or set it up for PXE installation as described in [Appendix B, PXE installation of XenServer host](#)

Note

If, after installing XenServer without Linux support, you decide later to add it, mount the Linux Pack installation CD or ISO image on the XenServer host and run the script **install.sh**, located in the root directory of the CD.

To install or upgrade the XenServer host**Warning**

If you are performing an upgrade, please ensure you do not have any suspended virtual machines as these may not be resumable after the upgrade. Please ensure that all CD drives of virtual machines have been ejected and are empty, and that HA is disabled before proceeding with an upgrade.

1. Boot the computer from the main installation CD, or PXE-boot from your TFTP server if applicable. See [Appendix B, PXE installation of XenServer host](#) for details on how to set up the XenServer media for PXE installation.
2. After the initial boot messages, the installer does some hardware detection and initialization, then presents a screen asking you to select which keyboard keymap you want to use for the installation. In this and the screens that follow, use **Tab** or **Alt+Tab** to move between elements, **Space** to select, and **F12** to move to the next screen.

Select the desired keymap and choose **OK** to proceed.

3. Next, the **Welcome to XenServer** screen is displayed. If you have been provided with any driver disks, select **Driver Disks**. You will then be lead through the process of installing the necessary drivers.

Once you have installed all necessary drivers, select **Install or upgrade XenServer host** and choose **OK** to proceed.

4. The next screen displays a message telling you that the setup program will install XenServer on the computer, and warns that it will overwrite data on any hard drives that you select to use for the installation. Choose **OK** to proceed.
5. The XenServer End User License Agreement (EULA) is displayed. Use the up and down arrow keys to scroll through and read the agreement. Choose **Accept EULA** to proceed.
6. At this point, if the computer on which you are installing the XenServer host does not have a CPU which supports hardware virtualization, or if the support is disabled in the BIOS, a message appears to warn you that you will not be able to run Windows VMs. Choose **OK** to proceed.

Warning

Some systems have bugs in their BIOS software which can result in the setting being incorrect. If you get a spurious warning about a lack of hardware virtualization (or do not see a warning when you expected one), hard reboot the host and restart the installation. You should also check the support site of the hardware manufacturer for BIOS upgrades.

7. If the installer detects a previously-installed version of XenServer host, you are offered the choice to perform a clean installation, or to upgrade the existing version, which preserves any of the VMs present. Select an installation type as appropriate and choose **OK** to proceed.

If you select to upgrade an existing version, you will get a message that the installer is going to create a backup of the existing installation. Choose **Continue** to proceed.

8. If you have multiple local hard disks, you are asked to choose the Primary Disk for the installation. Select the desired disk and choose **OK** to proceed. After selecting the primary one, you are also prompted to choose if you want any of the other drives to be formatted for use by XenServer for VM storage. Format all required drives and choose **OK** to proceed.

If the computer has a single hard disk, these two screens do not appear.

9. The next screen asks you to specify the source of the installation packages. If you are installing off the CD, you will most likely want to select **Local media**. If you are installing via PXE you will most likely want to select **HTTP or FTP** or **NFS**, as appropriate.

If you select **HTTP or FTP** or **NFS**, you are next prompted to set up Networking so that the installation script can connect to the product repository.

If the computer has multiple network interfaces, you are prompted to select one of them to be used to access the XenServer product repository. Select one and choose **OK** to proceed.

If the computer has a single network interface, that interface is used to access the XenServer product repository and no prompt is displayed.

You can select **Automatic configuration (DHCP)** to configure the NIC using DHCP, or **Static configuration**, which prompts you to configure the properties of the NIC manually. Following that, you are prompted to provide the URL or NFS server and path to where the installation media are, as appropriate.

Note

XenServer hosts must have static IP addresses to be part of a resource pool.

If you selected **Local media**, this networking setup appears later in the installation process.

If you selected **Local media**, the next screen asks if you want to install the Linux Pack from a second CD. If you are planning to install VMs that run Linux operating systems, choose **Yes**. If you are planning to install only Windows VMs, you can choose **No**.

Important

In a pooled setup, the Linux Pack must be installed either on *all* of the pool XenServer hosts, or on *none* of them, so that they are homogeneous.

10. The next screen asks if you want to verify the integrity of the installation media. If you select **Verify installation source**, the MD5 checksum of the packages is calculated and checked against the known value. This may take some time. If you select **Skip verification**, this check is bypassed. Make your selection and choose **OK** to proceed.
11. You are next prompted to set a root password. (This will be the password that the XenCenter application will use to connect to the XenServer host.) Enter the desired password and enter it again to verify it.

12. If you elected to perform a clean installation, you are next prompted to set up Networking for the management NIC, which is the interface that will be used to connect to the XenCenter.

If you selected to upgrade an existing installation, the existing management NIC configuration is used and these screens are bypassed.

If the computer has multiple network interfaces, you are prompted to select one of them to be used as the management NIC for the XenServer host software. Select one and choose **OK** to proceed.

If the computer has a single network interface, that interface is used as the management NIC and no prompt is displayed.

Next you can select **Automatic configuration (DHCP)** to configure the NIC using DHCP, or **Static configuration**, which prompts you to configure the NIC's properties manually.

Note

XenServer hosts need to have static IP addresses to be part of a resource pool.

13. If you elected to perform a clean installation, you are next prompted to specify the hostname and the configuration for the name service.

If you elected to upgrade an existing installation, the existing hostname and name service configuration is used and these screens are bypassed.

In the **Hostname Configuration** section, if you select **Automatically set via DHCP**, the DHCP server will provide the hostname along with the IP address. If you select **Manually specify**, enter the desired hostname for the server in the field provided.

In the **DNS Configuration** section, if you select **Manually specify**, enter the IP addresses of your primary (required), secondary (optional), and tertiary (optional) nameservers in the fields provided. Otherwise, choose **Automatically set up via DHCP** to get name service configuration via DHCP.

Select **OK** to proceed.

14. If you elected to perform a clean installation, you are prompted to select the general geographical area for the time zone. Choose from the displayed list of geographical areas, then choose **OK** to proceed. You are then prompted to select the specific locale for the time zone. You can type the first letter of the desired locale to jump to the first entry that begins with this letter. Choose from the displayed list of locales, then choose **OK** to proceed.

If you elected to upgrade an existing installation, the existing time zone and locale is used and these screens are bypassed.

15. If you elected to perform a clean installation, you are prompted to choose a method of setting the system time. You can select **Using NTP** or **Manual time entry**. Make your selection and choose **OK** to proceed.

If you selected to upgrade an existing installation, the existing method of setting system time is used and this screen is not displayed.

16. If you selected **Using NTP** in the preceding step, you are prompted to identify the time server or servers you want to use. You can check **NTP is configured by my DHCP server** and the time server will be set by DHCP. Otherwise, enter at least one NTP server name or IP address in the fields below. Choose **OK** to proceed.

Otherwise, the installation script moves to the next step; you are prompted for the manually-entered time later, near the end of the installation.

Warning

XenServer assumes that the time setting in the BIOS of the server is the current time in UTC, and that the time for the VMs reflects the local time based on the specified time zone offset.

17. A message is displayed that the installation is ready to proceed and that this will format the primary disk and any other disks selected for VM storage, destroying any data that is currently on them. Choose **Install XenServer** to proceed.

A progress bar is displayed as the installation commences. If you chose to set the system date and time manually, a dialog box appears when the progress bar has reached about 90%. Enter the correct numbers in the fields and choose **OK** to proceed.

18. If you are installing from CD and elected to include support for Linux VMs, you will be prompted to put in the Linux Pack disk. Eject the main disk, and insert the Linux Pack disk. Choose **OK**. A screen appears, identifying that this disk contains the Linux Pack. Select **Use media** to proceed with installing it. Another progress bar is displayed, and when it reaches 100%, a completion message is displayed.

If you selected not to install support for Linux VMs, a completion message is displayed.

Note

If you decide later to add Linux support, mount the Linux Pack installation CD or ISO image on the XenServer host and run the script **install.sh**, located in the root of the CD.

19. From the **Installation Complete** screen, eject the installation CD from the drive and select **OK** to reboot the server.

After the server boots, XenServer displays a splash screen, followed by **xsconsole**, a system configuration console.

- To manage the server with XenCenter, or to connect with an SSH terminal client, use the IP address displayed in the list of management network parameters. See [the section called “Installing XenCenter”](#) for instructions on installing XenCenter.
- To access a local shell from **xsconsole**, press **Alt+F3**.
- To return to **xsconsole**, press **Alt+F1**.

Installing XenCenter

XenCenter is a Windows client application. XenCenter must be installed on a remote machine that can connect to the XenServer host through the network. The .NET framework version 2.0 or above must also be installed.

Note

The XenCenter installation wizard can be used to install previous versions of XenCenter, which can be used to manage previous versions of XenServer. Running multiple versions of XenCenter on a single machine is supported.

To install XenCenter

1. Before installing XenCenter, be sure to uninstall any previous version.
2. Put the Base Pack CD in the drive or browse to the location you downloaded the installation file `XenCenter.msi` to.
3. If installing from CD:
 - If Auto-play is enabled for the CD drive, the application installer launches automatically after a few moments.
 - If Auto-play is not enabled for the CD drive, browse to the `/client_install` directory on the CD and find the file named `XenCenter.msi`. Then double-click on the file to launch the application installer.

If installing from the installation file `XenCenter.msi`, double-click on the file to launch the application installer.

4. Click **run** to start the installation wizard. Click **Next** on the first page of the setup wizard. On the **Custom Setup** page, XenCenter 4.1.0 is shown as a subfeature of XenCenter 5.5.0. If you have any XenServer 4.0.1 hosts that you want to manage, select it by clicking and choosing **Will be installed on local hard drive** or **Entire feature will be installed on local hard drive**. In this case, a separate XenCenter 4.1.0 will also be installed on your computer.

If you do not have any XenServer 4.0.1 hosts that you want to manage, leave this subfeature unselected.

Click **Next** to proceed.

5. The next page allows you to modify the default destination folder (`C:\Program Files\Citrix\XenCenter`). Click **Browse** to change the default installation location, if desired. You can also select whether XenCenter is installed so that every user of the computer can access it, or only the user logged into the current profile. Click **Next** to proceed.
6. On the next page, click **Install** to proceed.

Note

The installer creates a single desktop icon, for XenCenter 5.5.0. XenCenter 4.1.0 appears in the **All Programs** list on the **Start** menu.

7. When the installation process is complete, click **Finish** to close the Setup wizard. There will be a XenCenter icon on the desktop and a XenCenter item on the **All Programs** list.

Note

By default, XenCenter allows saving of usernames and passwords. To disable this, use the Registry Editor, navigate to the key `HKEY_CURRENT_USER\Software\Citrix\XenCenter` and add a key named `AllowCredentialSave` with the string value `false`. This causes XenCenter to no longer save usernames or passwords, and disables the **Save and Restore Connection State** dialog box in XenCenter (**Tools > Save and Restore**).

To uninstall XenCenter**Note**

If you installed XenCenter 4.1.0 along with XenCenter 5.5.0, the uninstallation process will remove both versions.

1. Select **Control Panel** from the **Start** menu.
2. In Windows XP or 2003, select **Add or Remove Programs**. In Windows Vista, select **Programs**, then select **Programs and Features**.
3. A list of programs installed on the computer is displayed. Scroll down if necessary and select **XenCenter**.
4. In Windows XP or 2003, click the **Remove** button. In Windows Vista, select **Uninstall** from the toolbar above the list of programs.

This will remove the Citrix application. At the end, a dialog box is displayed. Click **OK** to close the message box.

Installation and deployment scenarios

This section describes several common installation and deployment scenarios:

- one or more XenServer hosts with local storage
- two or more XenServer hosts with shared NFS storage
- two or more XenServer hosts with shared iSCSI storage

and details the steps that differ between scenarios.

XenServer hosts with local storage

The simplest use of XenServer is to set up a simple network of VMs running on one or more XenServer hosts without shared storage. This means that live relocation of VMs from one XenServer host to another is not possible, as this requires shared storage.

Requirements

- one or more 64-bit x86 servers with local storage
- one or more Windows workstations, on the same network as the XenServer hosts

Basic procedure

1. Install XenServer host software on the server(s)
2. Install XenCenter on the workstation(s)
3. Run XenCenter and connect to XenServer hosts

XenServer hosts with shared NFS storage

Adding shared storage to the XenServer network enables grouping of XenServer hosts into resource pools, enabling live relocation of VMs and sharing of server resources.

Requirements

- two or more 64-bit x86 servers with local storage
- one or more Windows workstations, on the same network as the XenServer hosts
- a server exporting a shared directory via NFS

Note

To be part of a resource pool, the XenServer hosts and the server or servers providing the shared NFS storage must have static IP addresses.

Basic procedure

1. Install XenServer host software on the server(s)
2. Install XenCenter on the workstation(s)
3. Set up the NFS server
4. Start XenCenter and connect to XenServer hosts
5. Create an SR on the NFS share at the pool level
6. Choose one XenServer host as a pool master and join other XenServer hosts to the pool.

For this procedure, the NFS server is assumed to be running a typical Linux distribution. Consult your Linux distribution documentation for further information.

Setting up an NFS share on an NFS server

1. Check to see if the portmap daemon is installed and running:

```
# chkconfig --list portmap
portmap          0:off  1:off  2:off  3:on   4:on   5:on   6:off
```

In the preceding example, runlevels 3, 4, and 5 are set to `on`. That means that at boot, for runlevels 3, 4 and 5, the portmap daemon is started automatically. If either 3, 4 or 5 are set to `off`, set them to `on` by running the following command:

```
chkconfig portmap on
```

2. Check to see if the NFS daemon is installed and running:

```
# chkconfig --list nfs
nfs          0:off   1:off   2:on    3:on    4:on    5:on    6:off
```

If either 3, 4 or 5 are set to `off`, set them to `on` by running the following command:

```
chkconfig nfs on
```

3. Create a directory for the shared storage:

```
mkdir /<vm_share_dir>
```

4. Edit the `/etc/exports` file to add the line

```
/<vm_share_dir> *(rw,no_root_squash, sync)
```

Save and close the file.

5. Restart the portmap and nfs daemons as follows:

```
service portmap restart
service nfs restart
```

The `<vm_share_dir>` should now be exported on the network and you should be able to use XenCenter to point to it using the **New Storage Repository** wizard. See the XenCenter online help for details.

Creating an SR on the NFS share at the pool level

1. Open a console on any XenServer host in the pool.
2. Create the storage repository on `server:/path`:

```
xe sr-create content-type=user type=nfs name-label=<sr_name=> \
  shared=true device-config:server=<server> \
  device-config:serverpath=<path>
```

The `device-config-server` refers to the hostname of the NFS server and `device-config-serverpath` refers to the path on the server. Since `shared` is set to true, the shared storage is automatically connected to every host in the pool and any hosts that subsequently join are also connected to the storage. The UUID of the created storage repository is printed to the console.

3. Find the UUID of the pool

```
xe pool-list
```

4. Set the shared storage as the pool-wide default

```
xe pool-param-set uuid=<pool_uuid> \
  default-SR=<storage_repository_uuid>
```

Since the shared storage has been set as the pool-wide default, all future VMs will have their disks created on this shared storage by default.

XenServer hosts with shared iSCSI storage

Adding shared storage to the XenServer network enables grouping of XenServer hosts into resource pools, enabling live relocation of VMs and sharing of server resources.

Requirements

- two or more 64-bit x86 servers with local storage
- one or more Windows workstations, on the same network as the XenServer hosts
- a server providing a shared directory over iSCSI

Note

To be part of a resource pool, the XenServer hosts and the server or servers providing the shared iSCSI storage must have static IP addresses.

Basic procedure

1. Install XenServer host software on the server(s)
2. Install XenCenter on the workstation(s)
3. Prepare the iSCSI storage
4. If necessary, enable multiple initiators on your iSCSI device
5. Run XenCenter and connect to XenServer hosts
6. Choose one XenServer host as a pool master and join other XenServer hosts to the pool
7. Configure the iSCSI IQN for each XenServer host
8. Create an SR on the iSCSI share at the pool level

The details of how to set up iSCSI storage differ between the various iSCSI solutions on the market. In general, though, you need to provide an iSCSI target on the SAN for the VM storage, and then configure XenServer hosts to be able to see and connect to it. This is done by providing a valid iSCSI Qualified Name (IQN) to the iSCSI target and to the iSCSI initiator on each XenServer host.

Prepare the iSCSI storage

1. Assign a virtual storage volume on the iSCSI device for VM storage
2. Create IQNs on the SAN for each XenServer host that will use the storage

You can use either XenCenter or the CLI to configure the IQN for each XenServer host and to create the SR. The following describes using the CLI; see the XenServer Help for details on using XenCenter.

Warning

When using the XenCenter to create SRs for iSCSI and NetApp storage, any existing contents of the volume are destroyed.

To configure the iSCSI IQN for each XenServer host via the CLI

1. On the host console, run the command:

```
xe-set-iscsi-iqn <iscsi_iqn>
```

Alternatively, used the CLI directly:

```
xe host-param-set uuid=<host_uuid> other-config-iscsi_iqn=<iscsi_iqn>
```

2. Repeat for each XenServer host in the pool.

To create an SR on the iSCSI share at the pool level using the CLI

1. On the console of any server in the pool, run the command:

```
xe sr-create name-label=<name_for_sr>  
content-type=user device-config-target=<iscsi_server_ip_address>  
device-config-targetIQN=<iscsi_target_iqn>  
device-config-localIQN=<iscsi_local_iqn>  
type=lvmoiscsi shared=true device-config-LUNid=<lun_id>
```

The *device-config-target* argument refers to the hostname or IP address of the iSCSI server. The *device-config-LUNid* argument can be a comma-separated list of LUN IDs. Since the *shared* argument is set to *true*, the shared storage is automatically connected to every host in the pool and any hosts that subsequently join are also connected to the storage.

The command returns the UUID of the created storage repository.

2. Find the UUID of the pool by running the command:

```
xe pool-list
```

3. Set the shared storage as the pool-wide default as follows:

```
xe pool-param-set uuid=<pool_uuid> default-SR=<iscsi_shared_sr_uuid>
```

Now that the shared storage has been set as the pool-wide default, all future VMs will have their disks created on shared storage by default.

Chapter 4. Updating and upgrading XenServer

This chapter documents how to update (apply minor update patches) or upgrade from an earlier version.

Rolling pool upgrade between major versions

XenServer allows you to upgrade a pool of XenServer hosts to the next major version, while keeping VMs on that pool running and thus avoids service downtime. This is achieved by upgrading on a host-by-host basis, with only one XenServer host offline at a time.

Note

This means that to upgrade from version 4.0.1 to version 5.5.0, you first upgrade version 4.0.1 to version 4.1.0, and then upgrade to version 5.5.0, and so on.

You can use XenCenter or the command line interface to migrate VMs running on a XenServer host running an older version of the product to one running either the same version or higher. It is not possible to migrate VMs located on a XenServer host with a newer XenServer version to one running an older version.

You should plan your upgrade path carefully. Citrix strongly advise against running a mixed-mode pool (one with multiple versions of XenServer co-existing) for longer than necessary. This is because the pool will be operating in a degraded state during the upgrade: all VMs will continue to function as normal, but control operations other than migration might not be available. Operations such as `vm-copy`, `vm-start`, and `vm-export` are not available. In particular, it is not safe to perform storage-related operations such as adding, removing or resizing virtual disks in this mode.

Backup

Citrix strongly recommends that you take a backup of the state of your existing pool using the **pool-dump-database** CLI command (see the *XenServer Administrator's Guide*). This allows you revert a partially complete rolling upgrade back to its original state without losing any VM data.

Note

Because it is not possible to migrate a VM from an upgraded XenServer host to a XenServer host running an older version of XenServer, it may be necessary to shut down VMs if you need to revert the rolling upgrade for any reason.

Warning

Always upgrade the master host first. Do not place the host into maintenance mode using XenCenter before performing the upgrade as this will cause a new master to be designated.

Performing a rolling pool upgrade

Warning

Disable HA functionality before performing a rolling upgrade.

The correct sequence for upgrading a pool of XenServer installations to a newer version is as follows:

1. Eject any CDs from your Virtual Machines before starting the rolling upgrade. Having CDs inserted during rolling upgrade can prevent migrations from working correctly, and due to the mode of operation of the pool while the rolling upgrade is taking place, it is required that this be done before the rolling upgrade is started.
2. Upgrade your XenCenter to the latest version. The newer version will continue to operate fine on older versions of XenServer hosts.
3. Verify that there are no VMs in the *Suspended* state. This is indicated in XenCenter by a blue paused icon. Any suspended VM with a CD drive attached (with the Tools ISO or a physical CD in the local physical drive, for example) cannot be resumed after performing an upgrade. To get a suspended VM back into a usable state, you have to perform a **Force Shutdown** on it and then restart it.
4. Migrate all VMs running on the pool master to other XenServer hosts using XenMotion. The pool master is identified in XenCenter as being the topmost server in the pool, and shows *Server type: Master* in the **General** tab when selected.
5. Shut down the pool master using XenCenter or the CLI. This will cause your pool to enter *emergency mode*. VMs will continue to run, but you will be unable to perform control operations. This is expected behavior.
6. Boot the pool master using your XenServer installation media or network and follow the instructions for doing an upgrade (see [Chapter 3, Installing XenServer](#)).
7. On restarting your pool master, after a few minutes your pool will leave emergency mode and normal service will be restored.
8. You are now ready to upgrade a second XenServer host. You should select a XenServer host still running an old version of XenServer and migrate the VMs running on this XenServer host to the one you have just upgraded. Do not attempt to migrate a VM from an upgraded XenServer host to one that has not yet been upgraded. You will see an error message if you attempt to do this, and your VM will continue running without being migrated.
9. Upgrade the member XenServer host you have just freed up following a similar procedure as for the master; shut down the host using XenCenter or the CLI (your pool will not enter emergency mode this time), then upgrade the server software using your product media or remote installation repository.

10. Repeat the previous two steps for each member XenServer host in the pool.
11. Now that you have upgraded the XenServer host software on your pool, it is important to upgrade the Citrix Tools for Virtual Machines on each VM. This will enable new functionality and ensure the stability of your VMs. Running old versions of Citrix Tools for Virtual Machines on newer XenServer installations is not a supported configuration except during the upgrade process. Please refer to the XenCenter Help, or the *XenServer Virtual Machine Installation Guide* for details on how to perform the upgrade of Citrix Tools for Virtual Machines for Windows and Linux VMs.

Note

In the unlikely event that a host fails (hardware failure, for example) during the rolling upgrade process, it is necessary to use the **xe host-forget** command to forget the host. Failure to do so will result in XenServer remaining stuck in rolling upgrade mode indefinitely.

Upgrading a single server

Upgrading a single server is a simple process. Simply shut down any running VMs, shut down the server, and follow the normal installation procedures. The installer will offer an option to upgrade your existing installation – be sure to select this option otherwise you will lose any existing data. Check that the final confirmation screen displays has 'upgrade' mentioned. You will not be required to re-enter any settings during the setup procedure.

Upgrading LVM storage from XenServer 5.0 or earlier

The LVM, LVM on HBA (LVMoHBA), and LVM on iSCSI (LVMoISCSI) storage types have new functionality in XenServer 5.5.0 including fast clone and snapshot support. You will need to upgrade your storage to the new format to take advantage of these new features – this can be done using XenCenter and the xe CLI. *This upgrade is a one-way operation and upgraded storage cannot be used with older versions of the XenServer software.* Upgrading storage to the format is an off-line operation.

Upgrading LVM-based SRs using the xe CLI

1. Check that your storage repository is attached correctly on all hosts before starting the upgrade procedure. If using XenCenter a warning icon will be displayed if the SR not is correctly attached. You can also verify this using the xe CLI using the **xbd-list** command and checking all PBDs have `currently-attached` set to `true`.
2. Call the **/opt/xensource/bin/xe-lvm-upgrade** tool to upgrade your SRs passing in the SR UUID of the SR you would like to upgrade – you will need to log into the control domain to run this using either the host console in XenCenter or a tool such as PuTTY:

```
/opt/xensource/bin/xe-lvm-upgrade <SR UUID>
```

This tool will indicate successful upgrade of your SRs.

Reinstalling the same version

The following procedure describes how to "freshen," or reinstall the current version of the XenServer host over an existing installation of XenServer host 5.5.0, and preserve settings on VMs.

Warning

When reinstalling your host, be aware that

- any custom RPMs which you might have installed on the XenServer host control domain will *not* be preserved
- if you have installed any XenServer hotfixes on the server, do *not* reinstall the original version; this is not supported

Reinstalling XenServer host from version 5.5.0

1. Perform an orderly shutdown on the VMs hosted on the XenServer host. If any of your VMs are in the suspended state, resume them first, and then perform an orderly shutdown on them too.

To shut down all the VMs automatically, you can also run the **service xapi-domains stop** command on the control domain terminal.

2. Reboot the XenServer host, and boot from the Installation CD.
3. The installation script identifies the version and prompts you whether you want to reinstall over the existing installation and preserve VMs. Select **OK** to proceed with the installation.
4. Follow the rest of the installation procedure as described in the section called “Installing the XenServer host”.
5. Run XenCenter and connect to the upgraded XenServer host.

Preparing XenServer hosts for maintenance

Before performing maintenance operations on a XenServer host that is part of a resource pool, you should disable it (which prevents any VMs from being started on it), then migrate its VMs to another XenServer host in the pool. This can most readily be accomplished by placing the XenServer host into Maintenance mode using XenCenter. See the XenCenter Help for details.

Warning

Citrix highly recommends rebooting all XenServers prior to installing an update and then verifying their configuration. This is because some configuration changes only take effect when a XenServer is rebooted, so the reboot may uncover configuration problems that would cause the update to fail.

To prepare a XenServer host in a pool for maintenance operations using the CLI

1. Run the command

```
xe host-disable uuid=<xenserver_host_uuid>  
xe host-evacuate uuid=<xenserver_host_uuid>
```

This will disable the XenServer host and then migrate any running VMs to other XenServer hosts in the pool.

2. Perform the desired maintenance operation.
3. Once the maintenance operation is completed, enable the XenServer host:

```
xe host-enable
```

Restart any halted VMs and/or resume any suspended VMs.

Before performing maintenance operations on a XenServer host that is not part of a resource pool, you should disable it (which prevents any VMs from being started on it), and then either shutdown or suspend its VMs.

Warning

Any suspended VM with a CD drive attached (with the Tools ISO or a physical CD in the local physical drive, for example) cannot be resumed after performing an upgrade. To get a suspended VM back into a usable state, perform a **Force Shutdown** on it and then restart it.

To prepare an unpooled XenServer host for upgrade using the CLI

1. Disable the XenServer host:

```
xe host-disable
```

2. Shut down or suspend any running VMs using the **xe vm-shutdown** or **xe vm-suspend** commands. If you choose to suspend any VMs, check that no CDs are attached to them.
3. Perform the desired maintenance operation.
4. Once the maintenance operation is completed, enable the XenServer host:

```
xe host-enable
```

Restart any halted VMs and/or resume any suspended VMs.

Applying updates

Between releases of XenServer software, Citrix occasionally releases updates to the software. These updates typically contain accumulated bug fixes and feature improvements. When an update is released, it is made accessible on the internet and an email announcement is sent to all XenServer customers.

Once downloaded apply the updates using XenCenter, or the CLI. Updates are applied through the **Updates Manager** dialog box, on the **Tools** menu. See the XenCenter Help for details.

Updates sometimes have special steps that have to be performed after the update is applied, such as requiring that the control domain is restarted. Whenever possible, updates will be such that they can be applied without interruption, but in some cases they might require XenServer host or VM restarts to be performed. In cases where a XenServer host restart is required, you can avoid downtime of virtual machines in a pooled environment by applying the update to each server in turn, migrating VMs away from each server in turn as the update is applied. XenCenter can take care of this update sequence automatically on your behalf using the **Manage Updates** feature. If you are using the CLI, you will have to do this manually using the **host-evacuate** command.

If you are using the CLI to perform the update, XenServer hosts to be updated should be prepared for this operation by performing the procedures in the section called [“Preparing XenServer hosts for maintenance”](#). If using XenCenter, this is taken care of automatically where required.

Applying updates using the CLI

First, the update must be uploaded to the pool or server to which it will be applied. This will cause a UUID (identifier) to be assigned to the update, and information about which servers it has been applied to will be tracked. Once an update has been uploaded to a pool or server, you can use the **patch-list** and **patch-param-list** commands to view information about the update. The second stage is to apply the update. Citrix recommends that the **patch-pool-apply** command is used to do this; this will result in the update being applied on all servers in the pool. Alternatively, the **patch-apply** command may be used to apply the update to one server in a pool - this may be useful when applying the update and then restarting individual servers in the pool. Pools should not be left in an inconsistent update state (one where updates have been installed on some servers and not others).

Discussion of procedures using the CLI below assume a basic knowledge of the usage of the **xe** tool. For information about this, please see the *XenServer Administrator's Guide*.

The update procedure is basically the same for both a single server and pool scenario, except that in a pooled scenario you must ensure that the update is applied to all servers in the pool. This will be achieved either by using the **patch-pool-apply** command, or by executing the **patch-apply** once for each host. These methods are described below.

Applying an update to a single XenServer host or a pool using the CLI:

1. Download the update to a local directory. Note the path to the update file you have downloaded. (It is also possible to download the update directly to an appropriate location on the server, e.g. `/root`, using standard Linux commands, but it is usually best to download it to a remote client first.)
2. Upload the update to your server or pool:

```
xe -s <my_server> -u <user_name> -pw <password> patch-upload \  
file-name=<update_file>
```

Here, the **-s** **-u**, and **-pw** options refer to the server, the username (which would usually be root), and the password, as usual - these would be omitted if running the command directly from a command shell on the XenServer host local console.

Once you have executed the above command, you will be given the UUID of the uploaded update. This UUID will be used to specify the update that is to be applied.

3. Be sure to follow any guidance regarding the update before continuing, in particular any information provided about whether VMs should be moved away from the server or that the server should be restarted after applying the update. As always, we recommend taking appropriate backup measures before making modifications to system software. To automatically move VMs to other servers, you can use the **host-evacuate** CLI command.
4. Apply the update to the pool. A command like the following may be used to do this:

```
xe patch-pool-apply uuid=<b89249c7-feba-41c5-8838-911ded969add>
```

This applies the update to all servers in the pool. Alternatively, if you need to restart servers and perform the update in a rolling manner, you can apply the update to an individual server by running a command like the following:

```
xe patch-apply host-uuid=<ebf17583-d8c5-4835-999a-e0a29716207d> \  
uuid=<b89249c7-feba-41c5-8838-911ded969add>
```

5. Verify that the update was applied by using the **patch-list** command again. Now the `hosts` field should contain the host UUID.

After an update is applied to a XenServer host, a small file containing the same information stored on the master from the **xe patch-upload** command is written to a subdirectory of the machine's patch directory. This enables XenServer hosts later ejected from the pool to repopulate their databases with information about updates already applied.

To reclaim space on the master, large updates can be deleted from disk using the **xe patch-clean** command. (The update information stored in the database of the master, though, is always retained.) These updates can be uploaded again using **xe patch-upload** if required.

Backing up and restoring XenServer hosts and VMs

Citrix recommends that, whenever possible, you leave the installed state of XenServer hosts unaltered. That is, do not install any additional packages or start additional services on XenServer hosts, and treat them as if they are appliances. The best way to restore, then, is to re-install XenServer host software from the installation media. If you have multiple XenServer hosts, the best approach is to configure a PXE boot server and appropriate answerfiles for this purpose (see [Appendix B, PXE installation of XenServer host](#)).

For VMs, the best approach is to install backup agents on them, just as if they were standard physical servers. For Windows VMs, as of this release we have tested CA [BrightStor ARCserve Backup](#), and Symantec [NetBackup](#) and [Backup Exec](#).

For more information about backup tools tested, best practices, and backups in general, see the [Citrix Knowledge Base](#).

Backing up Virtual Machine metadata

XenServer hosts use a database on each host to store metadata about VMs and associated resources such as storage and networking. When combined with storage repositories, this database forms the complete view of all VMs available across the pool. Therefore it is important to understand how to backup this database in order to recover from physical hardware failure and other disaster scenarios.

This section first describes how to backup metadata for single-host installations, and then for more complex pool setups.

Backing up single host installations

Use the CLI to backup the pool database. To obtain a consistent pool metadata backup file, run **pool-dump-database** on the XenServer host and archive the resulting file. The backup file will contain sensitive authentication information about the pool, so ensure it is securely stored.

To restore the pool database, use the **xe pool-restore-database** command from a previous dump file. If your XenServer host has died completely, then you must first do a fresh install, and then run the **pool-restore-database** command against the freshly installed XenServer host.

After a restoration of the pool database, some VMs may still be registered as being *Suspended*, but if the storage repository with their suspended memory state (defined in the *suspend-VDI-uuid* field) was a local SR, it will no longer be available since the host has been reinstalled. To reset these VMs back to the *Halted* state so that they can be started up again, use the **xe vm-shutdown vm=vm_name -force** command, or use the **xe vm-reset-powerstate vm=<vm_name> -force** command.

Warning

XenServer hosts restored using this method will have their UUIDs preserved. If you restore to a different physical machine while the original XenServer host is still running, there will be duplicate UUIDs. The

main observable effect of this will be that XenCenter will refuse to connect to the second XenServer host. Pool database backup is not the recommended mechanism for cloning physical hosts; use the automated installation support for that (see [Appendix B, PXE installation of XenServer host](#)).

Backing up pooled installations

In a pool scenario, the master host provides an authoritative database that is synchronously mirrored to all the member hosts in the pool. This provides a degree of built-in redundancy to a pool; the master can be replaced by any member since each of them have an accurate version of the pool database. Please refer to the *XenServer Administrator's Guide* for more information on how to transition a member into becoming a master host.

This level of protection may not be sufficient; for example, if your shared storage containing the VM data is backed up in multiple sites, but your local server storage (containing the pool metadata) is not. To fully recreate a pool given just a set of shared storage, you must first backup the **pool-dump-database** file on the master host, and archive this file.

Subsequently restoring this backup on a brand new set of hosts

1. Install a fresh set of XenServer hosts from the installation media, or via PXE.
2. Use the **xe pool-restore-database** on the host designated to be the new master.
3. Run the **xe host-forget** command on the new master to remove the old member machines.
4. Use the **xe pool-join** command on the member hosts to connect them to the new pool.

See [????](#) for specific restoration scenarios.

Backing up XenServer hosts

This section describes the XenServer host control domain backup and restore procedures. These procedures do *not* back up the storage repositories that house the VMs, but only the privileged control domain that runs Xen and the XenServer agent.

Note

Because the privileged control domain is best left as installed, without customizing it with other packages, Citrix recommends that you set up a PXE boot environment to cleanly perform a fresh installation from the XenServer media as a recovery strategy. In many cases you will not need to backup the control domain at all, but just save the pool metadata (see [the section called "Backing up Virtual Machine metadata"](#)). This backup method should always be considered complementary to backing up the pool metadata.

Another approach is to run the XenServer installation twice, selecting to back up the existing installation when prompted. This will create a pristine copy of the freshly-installed control domain that can later be restored if necessary by using the installation CD and choosing the Restore option.

Using the **xe** commands **host-backup** and **host-restore** is another approach that you can take. The **xe host-backup** command archives the active partition to a file you specify, and the **xe host-restore** command extracts an archive created by **xe host-backup** over the currently inactive disk partition of the host. This partition can then be made active by booting off the installation CD and choosing the **Restore** option.

After completing the above steps and rebooting the host, you must ensure that the VM meta-data is restored to a consistent state. This can be achieved by running **xe pool-restore-database** on `/var/backup/pool-database- $\{DATE\}$` . This file is created by **xe host-backup** using **xe pool-dump-database** command before archiving the running filesystem, to snapshot a consistent state of the VM metadata.

To back up a XenServer host

- On a remote host with enough disk space, run the command:

```
xe host-backup file-name=<filename> -h <hostname> -u root -pw <password>
```

This creates a compressed image of the control domain file system in the location specified by the `file-name` argument.

To restore a running XenServer host

- If you want to restore a XenServer host from a specific backup, run the following command while the XenServer host is up and reachable:

```
xe host-restore file-name=<filename> -h <hostname> -u root -pw <password>;
```

This command restores the compressed image back to the hard disk of the XenServer host on which the command is run (not the host on which `filename` resides). In this context “restore” is something of a misnomer, as the word usually suggests that the backed-up state has been put fully in place. The restore command here only unpacks the compressed backup file and restores it to its normal form, but it is written to another partition (`/dev/sda2`) and does *not* overwrite the current version of the filesystem.

- To use the restored version of the root filesystem, reboot the XenServer host using the XenServer installation CD and select the **Restore from backup** option.

After the restore from backup is completed, reboot the XenServer host and it will start up from the restored image.

Finally, restore the VM meta-data using

```
xe pool-database-restore file-name=/var/backup/pool-database-*
```

Note

Restoring from a backup as described here does *not* destroy the backup partition.

Restarting a crashed XenServer host

- If your XenServer host has crashed and is not reachable anymore, you need to use the XenServer installation CD to do an upgrade install. When that is completed, reboot the machine and make sure your host is reachable with XenCenter or remote CLI.
- Then proceed with the section called “Backing up XenServer hosts” above.

Backing up VMs

VMs are best backed up using standard backup tools running on them individually. For Windows VMs, we have tested CA BrightStor ARCserve Backup.

Chapter 5. XenServer Licensing

XenServer license keys are provided in the form of license files with the `.xslic` extension. A unique license file is issued to your organization by Citrix and can be installed on a XenServer host system in a number of different ways including:

- Applying the license file to a server from within XenCenter
- Using the **xe** command line interface (CLI) **xe host-license-add** command

Citrix XenServer is available for free production use with no restrictions or time limits. All you need to do is activate the product within 30 days of first installing XenServer to register your intent to use it with Citrix. Activation is a simple process that takes only a few minutes. It is required within 30 days of first installing XenServer and then again on an annual basis. When you are ready to add more advanced virtualization management features, you can upgrade to Citrix XenServer via a license key, with no additional software installation or downtime.

Citrix Essentials for XenServer builds on, and extends, the capabilities of the free XenServer virtualization platform, and includes High Availability, Dynamic Provisioning from single images, advanced performance reporting and alerting capabilities, advanced StorageLink™ technology, and automated Lab Management.

Note

To learn more about Citrix Essentials for XenServer and to find out how you can upgrade to it from Citrix XenServer, click [here](#).

To activate a Citrix XenServer system

Once you have downloaded and installed Citrix XenServer, activating or reactivating it is quick and easy using XenCenter. The **License Manager** in XenCenter lists all installed XenServer systems and shows the amount of time remaining before each product license expires or needs to be activated.

1. Open the **License Manager**: on XenCenter's **Tools** menu, click **License Manager**. Select the check box for each XenServer product you need to activate, and then click **Activate**.
2. A web browser will open and you will be taken to the Citrix XenServer activation web page where you can fill in your contact information and email address.

If XenCenter is unable to connect to the Citrix XenServer activation server, you will be asked if you want to save the activation details of the selected host servers to a file. You will then be able to import this file to the Citrix XenServer activation server later, once your internet connection is restored.

3. When you have completed the activation form, a licence file for each of the XenServer products you selected will be emailed to you.
4. Finally, you need to apply the appropriate license key to each XenServer host.

To install a license file using XenCenter:

1. Select the server in the **Resources** pane.
2. On the **Server** menu, click **Install License Key**.
3. Locate the license file and click **Open**. By default, only license files with the `.xslic` extension will be displayed.

Alternatively, you can simply double-click a license file in Windows Explorer, then select the server to which you want to apply the XenServer license from the list and click **OK**.

To install a license file using the xe CLI

1. Open a console on the server in one of the following ways:
 - use XenCenter with the server selected and click on the **Console** tab
 - use the local console and select **Local Command Shell**, or press **ALT+F3**
 - use an SSH-capable telnet client
2. Enter the command

```
xe host-license-add license-file=<path/license_filename>
```

Important

Each host system in a resource pool must be individually licensed. For example, if you are supporting four XenServer hosts in a resource pool, you must install a license file on each of the four host systems. Note that while it is possible to mix free Citrix XenServer and Citrix Essentials for XenServer hosts in the same pool, the advanced virtualization management features available with Citrix Essentials for XenServer, such as HA and email alerting, will only be available if all the hosts in the pool have a Citrix Essentials for XenServer license.

Q: The XenServer license has expired. What is going to happen?

A: If the license on a XenServer host expires or goes beyond its activation date while the system is still running, all active virtual machines continue to run as long as the host system is not disrupted. However, new VMs cannot be launched. If the host system is then disrupted (through a power failure, system restart, and so on), a Citrix Essentials for XenServer system will revert to Citrix XenServer-level functionality when its host is restarted.

Note

Citrix strongly encourages customers who opt for the Citrix Essentials for XenServer annual license to renew their new annual license before the expiration date to ensure the greatest degree of continuity. XenCenter and e-mail alerts (when configured) are generated daily from 30 days before the license is due to expire, to give you enough notice to upgrade.

Q: The license file from a previous version of XenServer does not work with XenServer 5.5.0

A: All license files from XenServer 3.x are incompatible with XenServer 5.5.0. XenServer 3.x customers under valid software maintenance or Subscription Advantage agreements will receive a valid XenServer 4.x license file from Citrix and these newly issued license files should be used in conjunction with XenServer 5.5.0.

XenServer 4.0.1 and 4.1.0 license files are forward-compatible with XenServer 5.5.0.

Q: This XenServer 4.0.1 license file has a `.txt` extension, but the product licensing instructions reference a license file with the `.xslic` extension. Does this mean that the XenServer 4.0.1 license is incompatible?

- A:** No. In general, XenServer 4.0.1 license files are forward-compatible with XenServer 5.5.0 and as a result XenCenter can import valid XenServer 4.x license files of any extension. For some administrators, it may be easier to rename an older XenServer 4.0.1 license key with a `.txt` extension to a file with the `.xslc` extension prior to applying the license file in XenCenter.
- Q:** Is there a way to manually install a XenServer license file without using XenCenter?
- A:** Yes. First, license files may be manually installed using the **xe** CLI or the menu-driven local console. The **host-license-add** command allows a local license file to be installed on a particular XenServer host. For more information about using **xe**, refer to the *XenServer Administrator's Guide*. Additionally, you can use Secure Copy (`scp`) to upload a license file from a system where the license file resides to a XenServer host. The target path on the XenServer host system must be `/etc/xensource/license`. Citrix strongly recommends using `scp` to apply a license file only as a last resort, for example, when XenCenter or a local command shell are unavailable.

Appendix A. Troubleshooting

If you experience odd behavior, crashes, or have other issues during installation, this chapter is meant to help you solve the problem if possible and, failing that, describes where logs are located and other information that can help your Citrix Solution Provider and Citrix track and resolve the issue.

Note

Citrix recommends that you follow the troubleshooting information in this chapter solely under the guidance of your Citrix Solution Provider or Citrix Support.

Citrix provides two forms of support: you can receive free self-help support via the [Support site](#), or you can [purchase our Support Services](#) and directly submit requests by filing an online Support Case. The Citrix web-based resources include product documentation, a Knowledge Base, and discussion forums.

The XenServer host installation CD runs Linux, so most standard Linux commands can be used to diagnose installation problems. There are three virtual terminals available during installation, which display the installation menu, an interactive console and an event log, respectively. Use the **ALT + F1-F3** keys to toggle between the virtual terminals.

You can check some basic things in the interactive terminal:

- **fdisk** lists all disks that can be seen as a result of the loaded storage device drivers. If a particular device driver did not load, for example, the driver for a RAID card, then the disks attached to that card will not appear in the output from the **fdisk** command.
- **ifconfig** shows the network configuration of physical NICs, including their IP addresses, netmasks, and gateway.
- **ping** can be used to verify network connectivity from the XenServer host to a remote IP address and vice-versa.

You should use the two additional virtual terminals solely under the guidance of your Citrix Solution Provider.

Installation logs are written to `/install/tmp/`

Appendix B. PXE installation of XenServer host

This appendix describes how to set up a TFTP server to enable PXE booting of XenServer host installations. It also describes how to create an XML answerfile, which allows you to perform unattended installations.

Setting up the PXE boot environment

To create a PXE environment, you need:

- a TFTP server to enable PXE booting
- a DHCP server to provide IP addresses to the systems that are going to PXE-boot
- an NFS, FTP, or HTTP server to house the installation files

These can all co-exist on the same server, or be distributed on different servers on the network.

Additionally, each system that you want to PXE boot and install the XenServer on needs a PXE boot-enabled Ethernet card.

The following steps assume that the Linux server or servers you will use have RPM support.

To set up a TFTP server for PXE booting

1. TFTP requires SYSLINUX 3.11 or above. SYSLINUX is a collection of boot loaders for the Linux operating system which operates on Linux EXT2/EXT3 file systems, MS-DOS FAT file systems, network servers using PXE firmware, and CD-ROMs. Make sure you have SYSLINUX version 3.11 or above installed on your system by running the command

```
#rpm -q syslinux
```

If you have an earlier version, you can download an appropriate later version from <ftp://ftp.kernel.org/pub/linux/utils/boot/syslinux/RPMS/i386/>, then install it by running the command

```
rpm -Uvh syslinux.-.rpm
```

2. Check if the tftp server package is installed:

```
rpm -q tftp-server
```

If not, use system-config-packages and install.

3. Edit the file `/etc/xinetd.d/tftp` to change the line

```
disable = yes
```

to

```
disable = no
```


- Restart the `xinetd` service, which manages `ftpp`:

```
service xinetd restart
```

- Make a directory inside `/tftpboot` called `xenserver`.
- Copy the files `mboot.c32` and `pxelinux.0` files from `/usr/lib/syslinux` to the `/tftpboot` directory.
- Copy the files `install.img`, `vmlinuz`, and `xen.gz` from the Base Pack CD (found in the root of the Base Pack CD, and in its `/boot` directory respectively), and place them in the `/tftpboot/xenserver` directory.
- Create a directory called `pxelinux.cfg` inside `/tftpboot` and create a file named `default`. The file contents depend on how you want to configure your PXE boot environment. For example, you might have a configuration file like the following:

Note

The backslashes at the ends of lines in the example PXE configuration files shown below denote continuation of lines; do *not* actually include them in your PXE configuration file.

Also note that the three hyphens in the examples are necessary parts of the `mboot.c32` loader syntax, and not including them will cause PXE boot attempts to fail.

```
default xenserver
label xenserver
  kernel mboot.c32
  append /tftpboot/xenserver/xen.gz dom0_mem=752M com1=115200,8n1i \
    console=com1, tty --- /tftpboot/xenserver/vmlinuz \
    console=ttyS0,115200n8 console=tty0 \
    --- /tftpboot/xenserver/install.img
```

This will start an installation on any machine that boots from this server. Someone would then need to manually respond to the prompts to complete the installation. Alternatively, you might have a configuration file like the following:

```
default xenserver-auto
label xenserver-auto
  kernel mboot.c32
  append /tftpboot/xenserver/xen.gz dom0_mem=752M com1=115200,8n1 \
    console=com1, tty --- /tftpboot/xenserver/vmlinuz \
    console=ttyS0,115200n8 console=tty0 \
    answerfile=http://pxehost.example.com/5.0.0-answerfile \
    install --- /tftpboot/xenserver/install.img
```

This will perform an unattended installation using the answerfile at the URL specified.

Note

The above examples show how to configure the installer to run on the physical console, `tty0`. Citrix recommends that you place the `console=` entry of the console you wish to use for the installation as the

last entry on the line, so if you wanted to install over serial then, in the examples above, the two entries would be reversed, as `console=tty0 console=ttyS0,115200n8`

For details on creating an answerfile for unattended installation, see [the section called “Creating an answerfile for unattended PXE installation”](#). For more information on PXE configuration file syntax, see [the SYSLINUX website](#).

Please refer to your server operating system manual for details for your specific operating system. The information here is a guide that can be used for Red Hat, Fedora, and some other RPM-based distributions.

To set up a DHCP server

1. On the server that you will be using for DHCP, check if you have DHCP installed by running the command:

```
rpm -qa dhcp
```

If not, install it using **system-config-packages**.

2. Configure the DHCP server. Refer to [document 1673 in the Red Hat Knowledge base](#) for details.
3. Add these lines to the end of the existing `dhcpd.conf` file:

```
allow booting;
allow bootp;
class "pxeclients" {
    match if substring(option vendor-class-identifier, 0, 9) = "PXEClient";
    next-server ;
    filename "pxelinux.0";
}
```

4. Restart the `dhcpd` service:

```
service dhcpd restart
```

Setting up the installation media host

1. On the server where you are going to house the installation files, copy the contents of the packages directories from the base pack CD to a location where they are exported by HTTP, FTP, or NFS. For example, you might make a directory in the document root of a webserver named `XenServer_5.5.0` and then copy the directory `packages.main` from the Base Pack disk to `XenServer_5.5.0/packages.main`.
2. If Linux support is also desired, copy `packages.linux` from the Linux pack disk to `XenServer_5.5.0/packages.linux`. This structure allows you to install either both packages by having the `source` element of the answerfile contain the enclosing directory `XenServer_5.5.0`, or you can install the base pack only (no support for Linux VMs) by putting in the path to `XenServer_5.5.0/packages.main`.

For example, to install both packages from the webserver `http://pxehost.example.com` where the packages are in the directories mentioned above relative to the server's document root, the answerfile would contain this source element:

```
<source type="url">http://pxehost.example.com/XenServer_5.0.0</source>
```

or, to install just the base pack:

```
<source type="url">
http://pxehost.example.com/XenServer_&PRODUCT_VERSION;/packages.main
</source>
```

In either case you can specify a username and password if required, for example:

```
<source type="url">
http://<username>:<password>@pxehost.example.com/XenServer_5.5.0/packages.main
</source>
```

Preparing the destination system

1. Start the system and enter the Boot Menu (**F12** in most BIOSes) and select to boot from your Ethernet card.
2. The system should then PXE boot from the installation source you set up, and the installation script will commence. If you have set up an answerfile, the installation can proceed unattended.

Creating an answerfile for unattended PXE installation

To perform installations in an unattended fashion, you need to create an XML answerfile. Here is an example answerfile:

```
<?xml version="1.0"?>
<installation>
  <primary-disk>sda</primary-disk>
  <guest-disk>sdb</guest-disk>
  <guest-disk>sd</guest-disk>
  <keymap>us</keymap>
  <root-password>mypassword</root-password>
  <source type="url">http://pxehost.example.com</source>
  <post-install-script type="url">
http://pxehost.example.com/myscripts/post-install-script
</post-install-script>
  <admin-interface name="eth0" proto="dhcp" />
  <timezone>Europe/London</timezone>
</installation>
```

All nodes should be within a root node named *installation*.

The following is a summary of the elements. All values should be text in the nodes, unless otherwise stated. Required elements are indicated.

Element	Description	Required?
<primary-disk>	The name of the storage device where the control domain should be installed, equivalent to the choice made on the <i>Select Primary Disk</i> step of the interactive installation process. Attributes: You can specify a <i>gueststorage</i> attribute with possible values <i>yes</i> and <i>no</i> . For example:	Y

Element	Description	Required?
	<pre><primary-disk gueststorage="no">sda</primary-disk></pre> <p>If this attribute is not specified, the default is <i>yes</i>. If you specify <i>no</i>, it is possible to automate an installation scenario where no storage repository is created, if, in addition, no guest-disk keys are specified.</p>	
<guest-disk>	The name of a storage device to be used for storing guests. You should use one of these elements for each extra disk.	N
<keymap>	The name of the keymap to use during installation. <keymap>us</keymap>	Y
<root-password>	The desired root password for the XenServer host.	Y
<source>	Where the packages should be installed from. Attributes: <i>type: url, nfs, or local</i> If local, leave the element empty. For example, <div data-bbox="641 1039 1266 1260" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <pre><source type="url"> http://server/packages </source> <source type="local" /> <source type="nfs"> server:packages </source></pre> </div>	Y
<driver-source>	Where the device driver packages should be installed from. Optional. Element may occur multiple times. Attributes: <i>type: url, nfs, or local</i> If local, leave the element empty. For example, <div data-bbox="641 1585 1266 1795" style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <pre><driver-source type="url"> http://server/drivers </driver-source> <driver-source type="local" /> <driver-source type="nfs"> server:drivers </driver-source></pre> </div>	N
<post-install-script>	Where the post-install-script is.	Y

Element	Description	Required?
	<p>Attributes:</p> <p>type: <i>url</i>, <i>nfs</i>, or <i>local</i></p> <p>If <i>url</i> or <i>nfs</i>, put the url or NFS path in the PCDATA; if <i>local</i>, leave the PCDATA empty. For example,</p> <pre><source type="url"> http://server/scripts </source> <source type="local" /> <source type="nfs"> server:scripts </source></pre>	
<admin-interface>	<p>The single network interface to be used as the host administration interface.</p> <p>Attributes:</p> <p>proto: <i>dhcp</i> or <i>static</i></p> <p>name: <i>eth0</i> for example.</p> <p>Children:</p> <ul style="list-style-type: none"> • <ip>: The IP address, if proto="static" • <subnet-mask>: The subnet mask, if proto="static" • <gateway>: The gateway, if proto="static" <p>All three child elements are <i>required</i> if proto="static"</p>	N
<timezone>	In the format used by the TZ variable, e.g. Europe/London, or America/Los_Angeles.	Y
<nameserver>	The IP address of a nameserver. You should use one of these elements for each nameserver you want to use.	N
<hostname>	Specify if you want to manually set a hostname.	N
<bootloader>	Specify which bootloader to install for startup time. Only change this if you have problems booting. Currently either <i>extlinux</i> (the default) or <i>grub</i> .	N

You can also perform automated upgrades by changing the answerfile appropriately. Set the mode attribute of the installation element to *reinstall*, specify the disk on which the existing installation lives with the *existing-installation* element, and leave the *primary-disk* and *guest-disk* elements unspecified. For example:

```
<?xml version="1.0"?>
  <installation mode="reinstall">
    <existing-installation>sda</existing-installation>
    <keymap>us</keymap>
    <root-password>mypassword</root-password>
    <source type="url">http://pxehost.example.com</source>
    <post-install-script type="url">
      http://pxehost.example.com/myscripts/post-install-script
    </post-install-script>
    <admin-interface name="eth0" proto="dhcp" />
    <timezone>Europe/London</timezone>
  </installation>
```

Appendix C. Xen Memory Usage

When calculating the memory footprint of a Xen host there are two components that must be taken into consideration. First there is the memory consumed by the Xen hypervisor itself; then there is the memory consumed by the host's *control domain*. The control domain is a privileged VM that provides low-level services to other VMs, such as providing access to physical devices. It also runs the management tool stack.

Setting Control Domain Memory

If your control domain requires more allocated memory, this can be set using the Xen CLI.

Use the **xe vm-memory-target-set** command to set the amount of memory available to the control domain.

The **xe vm-memory-target-wait** command can be used to check if the control domain has managed to attain the requested memory target specified at the last use of the **xe vm-memory-target-set** command. **xe vm-memory-target-wait** will not return until the memory target has been reached, or will time out if the target cannot be reached, for example when the target is lower than the actual memory requirements of the VM.

The following fields on a VM define how much memory will be allocated. The default values shown are indicative of a machine with 8 GiB of RAM:

name	default	description
memory-actual	411041792	The actual amount of memory current available for use by the VM
memory-target	411041792	The target amount of memory as set by using xe vm-memory-target-set
memory-static-max	790102016	The maximum possible physical memory
memory-dynamic-max	790102016	The desired maximum memory to be made available
memory-dynamic-min	306184192	The desired minimum memory to be made available
memory-static-min	306184192	The minimum possible physical memory

Dynamic memory values must be within the boundaries set by the static memory values. Additionally the memory target must fall in the range between the dynamic memory values.

Note

The amount of memory reported in XenCenter on the **General** tab in the **Xen** field may exceed the values set using this mechanism. This is because the amount reported includes the memory used by the control

domain, the hypervisor itself, and the crash kernel. The amount of memory used by the hypervisor will be larger for hosts with more memory.

To find out how much host memory is actually available to be assigned to VMs, get the value of the *memory-free* field of the host, and then use the **vm-compute-maximum-memory** command to get the actual amount of free memory that can be allocated to the VM:

```
xe host-list uuid=<host_uid> params=memory-free
xe vm-compute-maximum-memory vm=<vm_name> total=<host_memory_free_value>
```


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